

A novel material for next generation MEMS and Sensor Devices Project

Completed Technology Project (2012 - 2013)



Project Introduction

Our goal is to build a PS etching cell and determine how different fabrication parameters affect its thermal properties. We aim to demonstrate a very low thermal conductivity, capable for use in bolometers. Build an in-house capability to fabricate porous silicon on the detector development lab. Study methods for selective etching of porous silicon (ion implantation) to enable structures for MEMS devices and detectors. Test the thermal conductivity of porous silicon.

We will work with the University of Maryland to design a single tank etching cell. Etch porous silicon under different conditions and develop a method to characterize physical properties. Create fabrication processes that involve ion implantation and silicon-on-insulator wafers. Study the thermal conductivity.

Anticipated Benefits

The availability of porous silicon for high temperature superconducting infrared detectors will allow for improved performance and higher filling fraction of pixels.

Primary U.S. Work Locations and Key Partners

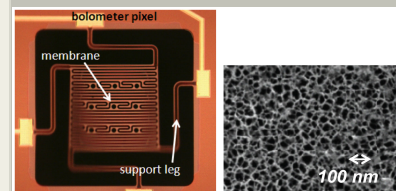
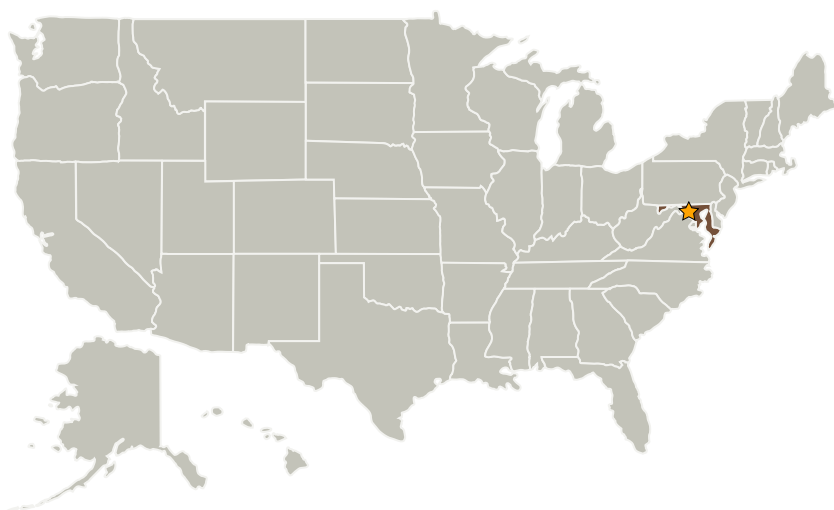


Figure 1: Example of high temperature superconducting bolometer using SiN supports.

Figure 2: Top view of porous silicon on a p-type substrate

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Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Images	2
Project Website:	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3

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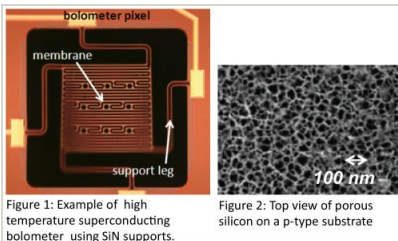


Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
University of Maryland-College Park(UMCP)	Supporting Organization	Academia	College Park, Maryland

Primary U.S. Work Locations

Maryland

Images



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(<https://techport.nasa.gov/image/3027>)

Project Website:

<https://www.facebook.com/NASA.GSFC>

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Innovation Fund: GSFC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Peter M Hughes

Project Manager:

Brook Lakew

Principal Investigators:

Amil A Patel

Shahid Aslam

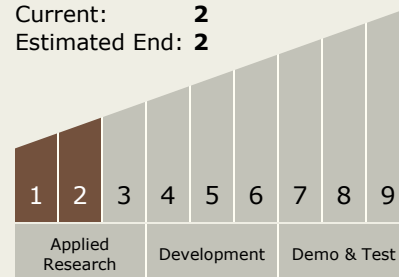
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Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes